

## **REMARKS**

### **Information Disclosure Statement**

The applicant acknowledges the Examiner's review of the Information Disclosure Statement filed on 14 January 2002.

### **Priority Application**

The applicant notes that the Examiner has acknowledged receipt of the certified copy of the priority application.

### **Claims**

Claims 1-51 were pending in the case at the time of this Office Action.

### **Section 112 rejections**

The Examiner has made several rejections based on 35 USC 112, second paragraph. Each of these is individually discussed.

#### **Claims 7, 43-45**

Claim 7 is rejected for lack of antecedent basis for the phrases "the catheter tip" and "the catheter." Claim 7 is amended above to make it clear that citation is being made to the working catheter and not to the reference catheter. In the original German text filed on 4 June, the reference unit at the catheter tip is reference numeral 4a and the other reference units are reference numerals 4b, 4c. In Figure 1, these numerals are found on catheter 10, which is the working catheter. Since claims 38, 39, 41 and 42 have the same limitation, they are amended identically. Claim 40 has been cancelled.

Claims 43-45 are rejected under Section 112 as being dependent from claim 7. With claim 7 now allowable, claims 43-45 are in allowable form.

#### **Claim 13**

Claim 13 is rejected for lack of antecedent basis for the term "the at least three working catheter reference units." Claim 13 is amended by inserting a limitation that the "plurality of working catheter reference units" comprises at least three such units. Again, support is found in reference numerals 4a-4c of Figure 1.

#### **Claim 19**

Claim 19 is rejected for lack of antecedent basis for the limitation "the processing units." While this is a correct translation of the German term "Verarbeitungseinheiten" in claim 19, the Examiner is also correct that the singular noun "Verarbeitungseinheit" is the word used in claim 1, so claim 19 is amended by changing the term "processing units" to "processing unit." This is supported by the singular processing unit 16 shown in Figure 1.

### Section 102 rejections

The Examiner has rejected a number of the claims as being anticipated by US Patent 6,490,474 B1 to Willis ("Willis '474"). The allowability of each claim over Willis '474 will now be discussed.

#### Claims 1, 4, 25, 26

Claim 1 has been amended by the incorporation of the limitation of claim 4 into claim 1. Claim 4 is considered allowable by the Examiner, if in independent form. For this reason, amended claim 1, which represents an independent version of claim 4, is no narrower than claim 4, and is also allowable. With the limitation of claim 4 now in claim 1, claim 4 has been cancelled.

Because claims 25 and 26 introduce the same limitation as claim 4, claims 25 and 26 are now cancelled as redundant.

#### Claims 2, 3, 24

Claims 2 and 3 depend from amended claim 1, which is now allowable over Willis '474. As proper dependent claims, claims 2 and 3 are now also allowable over Willis '474.

Claim 24 is allowable as a claim properly dependent from claim 3, even though the Examiner has found the particular added limitation of claim 24 in Willis '474.

#### Claims 5, 27, 28, 29

Claim 5 depends from amended claim 1, which is now allowable over Willis '474. As a proper dependent claim, claim 5 is now also allowable over Willis '474. Also, claim 5 has the limitation that the reference units of the working catheter are "asymmetrically arranged on the working catheter so that the orientation of the working catheter can be detected in the co-ordinate system of the reference catheter." The Examiner has not explicitly found this limitation to be present in Willis '474, so the applicant asserts that claim 5 is allowable for that reason also.

Claim 27 is equivalent to claim 5 once the limitation of claim 4 is incorporated into claim 1, so claim 27 is cancelled as redundant.

Claim 28 has the same limitation as claim 5, but depends from claim 2 after the amendment made above. It is allowable for the reason that claim 2 is allowable.

Claim 29 has the same limitation as claim 5, but depends from claim 3 after the amendment made above. It is allowable for the reason that claim 3 is allowable.

#### Claims 6, 34-37

Claim 6 depends from amended claim 1, which is now allowable over Willis '474. As a proper dependent claim, claim 5 is now also allowable over Willis '474. Also, claim 6 has the limitation that the reference units of the working catheter are "coils or ultrasonic crystals mounted on or in the catheter." The Examiner has not explicitly found this limitation to be present in Willis '474, so the applicant asserts that claim 6 is allowable for that reason also.

Claims 34-37 introduce the same limitation as claim 6. Of these, claim 35 is cancelled as being dependent from claim 27, which is also cancelled. However, claims 34 and 36-37 are allowable as proper dependent claims of allowable claims.

#### Claims 9, 47-51

Claim 9 depends from amended claim 1, which is now allowable over Willis '474. As a proper dependent claim, claim 9 is now also allowable over Willis '474. Also, claim 9 has the limitation that "either the reference catheter is also a working catheter or the working catheter is also a reference catheter, such that reference units for transmitting waves and reference units for receiving waves are provided on each catheter." The Examiner has not explicitly found this limitation to be present in Willis '474, so the applicant asserts that claim 9 is allowable for that reason also.

Claims 47-51 all depend from claim 9, either directly or indirectly. Since claim 9 is now allowable, claims 47-51 are now allowable as proper dependent claims. Of these claims, claims 48 and 49 have already been indicated as allowable by the Examiner.

#### Claim 10

Claim 10 depends from amended claim 1, which is now allowable over Willis '474. As a proper dependent claim, claim 10 is now also allowable over Willis '474. Also, claim 10 has the limitation that "the processing unit is adapted by means of the reference units to implement topological and/or electrical measurement of the endocardium in which the respective working catheter is disposed." The Examiner has not explicitly found this limitation to be present in Willis '474, so the applicant asserts that claim 10 is allowable for that reason also.

#### Claim 11

Claim 11 depends from amended claim 1, which is now allowable over Willis '474. As a proper dependent claim, claim 11 is now also allowable over Willis '474. Also, claim 11 has the limitation that "the reference catheter reference units irradiate electromagnetic radiation and/or ultrasonic waves to ascertain the position of the working catheter in the co-

ordinate system afforded by the reference catheter, wherein the reference catheter reference units build up at least one electromagnetic field.” The Examiner has not explicitly found this limitation to be present in Willis ‘474, so the applicant asserts that claim 11 is allowable for that reason also.

#### Claim 12

Claim 12 depends from amended claim 1, which is now allowable over Willis ‘474. As a proper dependent claim, claim 12 is now also allowable over Willis ‘474. Also, claim 12 has the limitation that “the reference catheter is placed in the coronary sinus for use of the system in the heart.” The Examiner has not explicitly found this limitation to be present in Willis ‘474, so the applicant asserts that claim 12 is allowable for that reason also.

#### Claim 13

As described above, claim 13 has been amended to overcome the section 112 rejection and the Examiner has made no finding that claim 13 is otherwise anticipated by Willis ‘474. As a claim dependent from allowable amended claim 1, claim 13 is now allowable.

#### Claim 14

Claim 14 depends from amended claim 1, which is now allowable over Willis ‘474. As a proper dependent claim, claim 14 is now also allowable over Willis ‘474.

#### Claim 16

Claim 16 depends from amended claim 1, which is now allowable over Willis ‘474. As a proper dependent claim, claim 16 is now also allowable over Willis ‘474. Also, claim 16 has the limitations that “the system has between two and five working catheters” and that “each catheter has between three and twenty-four reference units which are electrodes to detect the corresponding number of potential differences in the case of working catheters inserted into a cavity in a heart.” The Examiner has not explicitly found this limitation to be present in Willis ‘474, so the applicant asserts that claim 16 is allowable for that reason also.

#### Claims 20-23

Claims 20, 22 and 23 depend from amended claim 1, and claim 21 depends from claim 20. Since claim 1 is now allowable over Willis ‘474, claims 20-23 are now also allowable over Willis ‘474.

#### Claims 30-33

Claims 30-33 introduce the same limitation to claims 5, 27-29, respectively. For the reason that claims 5, 28 and 29 are now allowable, claims 30, 32 and 33 are now allowable.

Claim 31 is cancelled, because it is dependent through claims 4 and 27, which have been cancelled.

**Allowable subject matter**

The Examiner has indicated that a number of the claims would be allowable if in independent form.

**Claim 4**

Claim 4 is cancelled, its limitation having been incorporated into claim 1, rendering claim 1 allowable.

**Claims 7, 38, 39, 41-45**

As described above, claim 7 has been amended to overcome the section 112 rejection and the Examiner has made no finding that claim 7 is otherwise anticipated by Willis '474. As a claim dependent from allowable amended claim 1, claim 7 is now allowable.

Claims 38-42 have the same limitation as claim 7, so they are likewise allowable, but claim 40 has been cancelled as being dependent from claim 35, which has also been cancelled.

Claims 43-45 are allowable as claims properly dependent from allowable claim 7.

**Claims 8, 46**

Claim 8 depends from amended claim 1, which is now allowable over Willis '474. As a claim previously objected to as being dependent upon a rejected base claim, claim 8 is now allowable with claim 1 being allowable.

Claim 46 is rejected under Section 102 as being anticipated by Willis '474, but this rejection is believed to be in error, since claim 46 depends from claim 8, which is indicated as allowable. For that reason, claim 46 is believed to be allowable.

**Claim 15**

Claim 15 depends from amended claim 1, which is now allowable over Willis '474. As a claim previously objected to as being dependent upon a rejected base claim, claim 15 is now allowable with claim 1 being allowable.

**Claim 17**

Claim 17 depends from amended claim 1, which is now allowable over Willis '474. As a claim previously objected to as being dependent upon a rejected base claim, claim 17 is now allowable with claims 1, 16 being allowable.

**Claim 18**

Claim 18 depends from amended claim 1, which is now allowable over Willis '474. As a claim previously objected to as being dependent upon a rejected base claim, claim 18 is now allowable with claim 1 being allowable.

#### Claim 19

Claim 19 depends from amended claim 1, which is now allowable over Willis '474. As a claim previously rejected only under section 112, and not rejected as being anticipated by Willis '474, claim 19 is also allowable for that reason.

#### Claims 52-55

Claim 52 combines the limitations of amended claim 7 into claim 1 to present a new independent claim that is of the same scope as claim 7, which the Examiner has indicated to be allowable.

New claims 53-55 are equivalent in scope to claims 43-45, respectively, and are allowable for the reason that claims 43-45 are allowable.

#### Claims 56, 57

Claim 56 combines the limitations of claim 8 into claim 1 to present a new independent claim that is of the same scope as claim 8, which the Examiner has indicated to be allowable.

Claim 57 has the same form as claim 46, and is believed to be allowable for the same reason claim 46 is allowable.

#### Claim 58

Claim 58 combines the limitations of claim 15 into claim 1 to present a new independent claim that is of the same scope as claim 15, which the Examiner has indicated to be allowable.

#### Claim 59

Claim 59 combines the limitations of claim 18 into claim 1 to present a new independent claim that is of the same scope as claim 18, which the Examiner has indicated to be allowable.

#### Claim 60

Claim 60 combines the limitations of claim 19 into claim 1 to present a new independent claim that is of the same scope as claim 19, which has only been rejected under Section 112.

All remaining claims now apparently allowable, prompt reconsideration and withdrawal of the rejections is earnestly requested.

Respectfully submitted,



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## CLEAN COPY OF THE AMENDED CLAIMS

1. (twice amended) A system for determining an intracorporal position of a working catheter, comprising
  - a working catheter for carrying out desired working operations, said working catheter comprising a catheter that is fixedly implantable in a body and that carries electrodes of a cardiac pacemaker or a defibrillator; and
  - an intracorporal reference catheter for producing a co-ordinate system,
  - wherein the working catheter has a plurality of working catheter reference units for sending signals which are characteristic for the position of the working catheter, and
  - the reference catheter has a plurality of reference catheter reference units for receiving the signals sent by the working catheter reference units, and
  - a processing unit for calculating the position and an intracorporal orientation of the working catheter on the basis of signals received from the reference catheter reference units.
7. (twice amended) The system of claim 1,
  - wherein at least one reference unit is arranged at a tip of the working catheter, and
  - at least one further reference unit is arranged in the rest of the distal region of the working catheter.
13. (twice amended) The system of claim 1, wherein
  - the plurality of working catheter reference units comprises at least three working catheter reference units; and
  - the processing unit calculates a three-dimensional spline that represents the position of the working catheter in the reference catheter co-ordinate system from the data from the at least three working catheter reference units.
19. (twice amended) The system of claim 1,
  - wherein the working catheter has at least two electrodes mounted on the working catheter at different locations from the reference units, wherein , relative to the electrodes, the reference units are in a previously established specific spatial position that can be taken into account by the processing unit when ascertaining the position of the working catheter in the co-ordinate system defined by the reference catheter.



28. (amended) The system of claim 2,  
wherein the working catheter reference units are asymmetrically arranged on the working catheter so that the orientation of the working catheter can be detected in the co-ordinate system of the reference catheter.
29. (amended) The system of claim 3,  
wherein the working catheter reference units are asymmetrically arranged on the working catheter so that the orientation of the working catheter can be detected in the co-ordinate system of the reference catheter.
38. (amended) The system of claim 6,  
wherein at least one reference unit is arranged at a tip of the working catheter, and  
at least one further reference unit is arranged in the rest of the distal region of the working catheter.
39. (amended) The system of claim 34,  
wherein at least one reference unit is arranged at a tip of the working catheter, and  
at least one further reference unit is arranged in the rest of the distal region of the working catheter.
41. (amended) The system of claim 36,  
wherein at least one reference unit is arranged at a tip of the working catheter, and  
at least one further reference unit is arranged in the rest of the distal region of the working catheter.
42. (amended) The system of claim 37,  
wherein at least one reference unit is arranged at a tip of the working catheter, and  
at least one further reference unit is arranged in the rest of the distal region of the working catheter.
52. (new) A system for determining an intracorporal position of a working catheter, comprising  
a working catheter for carrying out desired working operations; and  
an intracorporal reference catheter for producing a co-ordinate system,

wherein the working catheter has a plurality of working catheter reference units for sending signals which are characteristic for the position of the working catheter, at least one said reference unit being arranged at a tip of the working catheter and at least one further said reference unit being arranged in the rest of the distal region of the working catheter, and

wherein the reference catheter has a plurality of reference catheter reference units for receiving the signals sent by the working catheter reference units, and

a processing unit for calculating the position and an intracorporal orientation of the working catheter on the basis of signals received from the reference catheter reference units.

53. (new) The system of claim 52,

wherein the at least one further reference unit is a plurality of said reference units.

54. (new) The system of claim 53,

wherein there are at least twelve said further reference units arranged in the rest of the distal region of the catheter.

55. (new) The system of claim 53,

wherein there are fewer than twenty-four further reference units arranged in the rest of the distal region of the catheter.

56. (new) A system for determining an intracorporal position of a working catheter, comprising

a working catheter for carrying out desired working operations; and

an intracorporal reference catheter for producing a co-ordinate system,

wherein the working catheter has a plurality of working catheter reference units for sending signals which are characteristic for the position of the working catheter, and

the reference catheter has a plurality of reference catheter reference units for receiving the signals sent by the working catheter reference units, and

a processing unit for calculating the position and an intracorporal orientation of the working catheter on the basis of signals received from the reference catheter reference units,

wherein a distal region of the working catheter is of a previously established specific shape on which distal region at least three reference units are distributed so that the specific, previously established shape of the distal region can be incorporated by the processing unit

when ascertaining the position of the working catheter by calculating the position of the working catheter.

57. (new) The system of claim 56,

wherein the previously established specific shape is a circular arc.

58. (new) A system for determining an intracorporal position of a working catheter, comprising

a working catheter for carrying out desired working operations; and

an intracorporal reference catheter for producing a co-ordinate system,

wherein the working catheter has a plurality of working catheter reference units for sending signals which are characteristic for the position of the working catheter, and

the reference catheter has a plurality of reference catheter reference units for receiving the signals sent by the working catheter reference units, and

a processing unit for calculating the position and an intracorporal orientation of the working catheter on the basis of signals received from the reference catheter reference units, and

wherein at least one of the reference units is a sensor for detecting the presence and/or the strength of the wall contact of the working catheter with the endocardium surrounding the catheter.

59. (new) A system for determining an intracorporal position of a working catheter, comprising

a working catheter for carrying out desired working operations; and

an intracorporal reference catheter for producing a co-ordinate system,

wherein the working catheter has a plurality of working catheter reference units for sending signals which are characteristic for the position of the working catheter, and

the reference catheter has a plurality of reference catheter reference units for receiving the signals sent by the working catheter reference units, and

a processing unit for calculating the position and an intracorporal orientation of the working catheter on the basis of signals received from the reference catheter reference units,

wherein the reference units are electrodes that are actuatable simultaneously by the processing unit.

60. (new) A system for determining an intracorporal position of a working catheter, comprising

- a working catheter for carrying out desired working operations; and
- an intracorporal reference catheter for producing a co-ordinate system, wherein the working catheter has a plurality of working catheter reference units for sending signals which are characteristic for the position of the working catheter, and the reference catheter has a plurality of reference catheter reference units for receiving the signals sent by the working catheter reference units, and
- a processing unit for calculating the position and an intracorporal orientation of the working catheter on the basis of signals received from the reference catheter reference units, wherein the working catheter has at least two electrodes mounted on the working catheter at different locations from the reference units, wherein , relative to the electrodes, the reference units are in a previously established specific spatial position that can be taken into account by the processing unit when ascertaining the position of the working catheter in the co-ordinate system defined by the reference catheter.

## Non-Amended Claims

2. (amended) The system as set forth in claim 1  
wherein the working catheter is a mapping catheter for generating a three-dimensional image of the heart cavity surrounding the mapping catheter.
3. (amended) The system of claim 1,  
wherein the working catheter is an ablation catheter for producing a lesion of the endocardium surrounding the ablation catheter.
5. (amended) The system of claim 1,  
wherein the working catheter reference units are asymmetrically arranged on the working catheter so that the orientation of the working catheter can be detected in the co-ordinate system of the reference catheter.
6. (amended) The system of claim 1,  
wherein the reference units are coils or ultrasonic crystals mounted on or in the catheter.
8. (amended) The system of claim 1,  
wherein the distal region of the working catheter is of a previously established specific shape on which distal region at least three reference units are distributed so that the specific, previously established shape of the distal region can be incorporated by the processing unit when ascertaining the position of the working catheter by calculating the position of the working catheter.
9. (amended) The system of claim 1,  
wherein either the reference catheter is also a working catheter or the working catheter is also a reference catheter, such that reference units for transmitting waves and reference units for receiving waves are provided on each catheter.
10. (amended) The system of claim 1,

wherein the processing unit is adapted by means of the reference units to implement topological and/or electrical measurement of the endocardium in which the respective working catheter is disposed.

11. (amended) The system of claim 1,  
wherein the reference catheter reference units irradiate electromagnetic radiation and/or ultrasonic waves to ascertain the position of the working catheter in the co-ordinate system afforded by the reference catheter, wherein the reference catheter reference units build up at least one electromagnetic field.
12. (amended) The system of claim 1,  
wherein the reference catheter is placed in the coronary sinus for use of the system in the heart.
14. (amended) The system of claim 1,  
wherein the processing unit is integrated in the respective catheters.
15. (amended) The system of claim 1,  
wherein at least one of the reference units is a sensor for detecting the presence and/or the strength of the wall contact of the working catheter with the endocardium surrounding the catheter.
16. (amended) The system of claim 1,  
wherein the system has between two and five working catheters, wherein each catheter has between three and twenty-four reference units which are electrodes to detect the corresponding number of potential differences in the case of working catheters inserted into a cavity in a heart.
17. (amended) The system of claim 16,  
wherein the electrodes are ring electrodes.
18. (amended) The system of claim 1,  
wherein the reference units are electrodes that are actuatable simultaneously by the processing unit.

20. (amended) The system of claim 1, comprising  
control members at the proximal end of the working catheter for producing a rotation  
of the working catheter and/or a flexing of the distal end of the working catheter.
21. (amended) The system of claim 20, comprising  
a first signal line, extending from the distal tip to the proximal end of the working  
catheter and connecting to the working catheter reference units, and  
a second signal line, extending from the distal tip to the proximal end of the reference  
catheter and connecting to the reference catheter reference units,  
wherein the processing unit is connected by way of the first signal line to the working  
catheter reference units and by way of the second signal line to the reference catheter  
reference units, and  
wherein the processing unit is connected to the control members actuates the control  
members in response to the signals from the reference catheter reference units in order to  
produce a rotation or a flexing of the working catheter.
22. (amended) A working catheter having a distal tip and a proximal end for use in a  
system as set forth in claim 1  
characterised by  
reference units for sending signals which are characteristic for the position of the  
working catheter, and  
a signal line which extends from the distal tip to the proximal end of the working  
catheter and which is connected to the reference units.
23. (amended) A reference catheter having a distal tip and a proximal end for use in a  
system as set forth in claim 1  
characterised by  
reference units for receiving position signals, and  
a signal line which extends from the distal tip to the proximal end of the reference  
catheter and which is connected to the reference units.
24. (new) The system of claim 3,

wherein the ablation catheter produces a linear lesion.

30. (new) The system of claim 5,  
wherein the working catheter reference units are arranged to form the corners of a triangle.

31. (new) The system of claim 27,  
wherein the working catheter reference units are arranged to form the corners of a triangle.

32. (new) The system of claim 28,  
wherein the working catheter reference units are arranged to form the corners of a triangle.

33. (new) The system of claim 29,  
wherein the working catheter reference units are arranged to form the corners of a triangle.

34. (new) The system of claim 5,  
wherein the reference units are coils or ultrasonic crystals mounted on or in the catheter.

36. (new) The system of claim 28,  
wherein the reference units are coils or ultrasonic crystals mounted on or in the catheter.

37. (new) The system of claim 29,  
wherein the reference units are coils or ultrasonic crystals mounted on or in the catheter.

43. (new) The system of claim 7,  
wherein the at least one further reference unit is a plurality of said reference units.

44. (new) The system of claim 43,



wherein there are at least twelve said further reference units arranged in the rest of the distal region of the catheter.

45. (new) The system of claim 43,  
wherein there are fewer than twenty-four further reference units arranged in the rest of the distal region of the catheter.

46. (new) The system of claim 8,  
wherein the previously established specific shape is a circular arc.

47. (new) The system of claim 9,  
wherein either the reference catheter is also a working catheter or the working catheter is also a reference catheter, such that reference units for simultaneously transmitting waves and receiving waves are provided on each catheter.

48. (new) The system of claim 9,  
wherein the waves transmitted or received by the reference units are electromagnetic.

49. (new) The system of claim 47,  
wherein the waves transmitted or received by the reference units are electromagnetic.

50. (new) The system of claim 9,  
wherein the waves transmitted or received by the reference units are ultrasonic.

51. (new) The system of claim 47,  
wherein the waves transmitted or received by the reference units are ultrasonic.